

Appl. No. 10/541,624
Amdt. Dated July 17, 2007
Reply to Office Action of April 20, 2007

Listing of Claims:

1. (Currently Amended) A method of tracking an instrument that is inserted into the body of a patient (4)-using only 2-D imagery, the method comprising the steps of:
 - a) detection of a movement signal which represents the movement phases of a periodic internal movement of the body;
 - b) generation of 2D images of a body volume of interest, and storage thereof in an image database together with the associated imaging parameters and the associated movement phase;
 - c) measurement of the spatial position of the instruments;
 - d) selection of at least one 2D image from the image database, which 2D image corresponds in terms of its associated movement phase to the movement phase belonging to the measured spatial position of the instrument;
 - e) determination of the position of the instrument on the selected 2D image.
2. (Previously Amended) A method as claimed in claim 1, wherein an electrocardiogram and/or a breathing movement signal that is dependent on the breathing movement of the patient is detected as movement signal.
3. (Previously Amended) A method as claimed in claim 1, wherein the position of the instrument is represented superposed on the selected 2D images.
4. (Previously Amended) A method as claimed in claim 1, wherein, in step d), only 2D images from a single movement phase are available for selection from the image database.
5. (Previously Amended) A method as claimed in claim 1, wherein steps b) and c) to e) are carried out a number of times and in varying order.

Appl. No. 10/541,624
Amdt. Dated July 17, 2007
Reply to Office Action of April 20, 2007

6. (Previously Amended) A method as claimed in claim 1, wherein the image database contains 2D images from various projection directions.
7. (Previously Amended) A method as claimed in claim 1, wherein the 2D images are generated in step b) by means of X-radiation and/or ultrasound.
8. (Previously Amended) A method as claimed in claim 1, wherein at least one reference probe is fitted on a movable X-ray device which is provided for generating the 2D images.
9. (Previously Amended) A method as claimed in claim 1, wherein at least one reference probe is arranged on or in the body of the patient.
10. (Previously Amended) A method as claimed in claim 1, wherein the breathing movement is compensated for using movement models of the body.
11. (Currently Amended) An arrangement for tracking an instrument that is inserted into the body of a patient using only 2-D imagery, the arrangement comprising:
 - a) a device for generating 2D images of a body volume of interest;
 - b) a unit for determining the set imaging parameters of the device;
 - c) a signal measurement unit for detecting a movement signal which represents movement phases of a periodic internal movement of the body;
 - d) a storage unit for storing an image database of 2D images of the body volume together with the associated imaging parameters and the associated movement phases;
 - e) a position measurement unit for determining the spatial position of the instrument that is inserted into the body;
 - d) a control and computation unit for selecting at least one 2D image from the image database, which 2D image corresponds in terms of its associated movement

Appl. No. 10/541,624
Amdt. Dated July 17, 2007
Reply to Office Action of April 20, 2007

phase to the movement phase belonging to the spatial position of the instrument, and for determining the position of the instrument on the selected 2D image.

12. (Previously Amended) An arrangement as claimed in claim 11, wherein it is designed for carrying out a method as claimed in claim 1.

13. (Currently Amended) An instrument tracking system for tracking an instrument that is inserted into the body of a patient using only 2-D imagery, the instrument comprising:

- a) a means for generating and storing 2D images of a volume of interest in a body prior to insertion of an instrument into the body;
- b) a means for measuring movement phases of a periodic internal movement of the body;
- c) a means for correlating said 2D images with said movement phases;
- d) a means for tracking the position of the instrument upon insertion into the body;
- e) a means for selecting a stored 2D image based on real-time measurement of the movement phases; and
- f) a means for superimposing the position of the instrument with the selected 2D stored image.

14. (Currently Amended) The instrument tracking system of claim 13, wherein the periodic internal movement of the body is caused by the a cardiac system.

15. (Currently Amended) The instrument tracking system of claim 13, wherein the periodic internal movement of the body is caused by the a respiratory system.

16. (Previously Submitted) The instrument tracking system of claim 13, wherein the means for measuring movement phases includes an electrocardiogram.

Appl. No. 10/541,624
Am dt. Dated July 17, 2007
Reply to Office Action of April 20, 2007

17. (Previously Submitted) The instrument tracking system of claim 13, further comprising at least one reference probe positioned on at least one of the means for generating 2D images and the body.